

Observations on several genera and species of fish, belonging to the natural family of the Esoxes. By C. A. LESUEUR.

On the Genus BELONA of Cuvier.

My observations on this genus incline me to believe, that the *Esox Belona*, described by Dr. Mitchell, is not, as he supposed, the same with that of Europe. The drawings of several species which I have made in the West Indies and the United States gave rise to this doubt, to all of which is alike applicable the short description given us by the Doctor, and it can therefore be merely regarded as a notice of the existence of one of these species in the northern atlantic, and on the coasts of the United States.

Mr. Cuvier observes, that the species of this genus are not yet well distinguished,† that they resemble each other so much, and present at the first view so little difference, that they all might apparently be embraced in the same description; that those who had observed them had been deceived by neglecting to obtain drawings, by which it would have been easy to observe their differences in a manner more sensible and more exact. It is from descriptions, and the comparisons of four different drawings from nature, made in different places, that I now consider myself authorized to distinguish three new spe-

† Regne Animal, Vol. II. p. 186.

cies, which no doubt have been previously observed and considered as one and the same, existing throughout various seas.

Essential Character.

In these fish the maxillary bone forms the whole border of the upper jaw, which, as well as the inferior, is extended into a long snout; they are both likewise armed with small teeth. The mouth has no other teeth than those of the pharynx, which are as it were paved. The body is elongated and covered with scales, which are not very apparent, excepting a longitudinal carinated range on each side, near the lower border. The back is remarkable for its colour, which is of a fine green. The species of this genus differ also somewhat from the *Esoces* in their intestines.

B. **argalus.*

Dorsal and anal fins unequal, their posterior extremities directly opposite, the anterior part of the anal more advanced; tail deeply forked, lobes arched, the inferior longer; the lamina of the operculum equal; the head depressed.

Body subquadrangular, attenuated to more than three times the length of the beak, the tail laterally carinated. Lower mandible a little longer than the superior. Eyes very large, a little oblong, the pupil somewhat depressed above. Lateral line very low, interrupted by the ventral fins, and beginning to rise above the base of the anal, are then continued

along the middle of the tail upon the carina. Anal and caudal fins falciform, posteriorly narrowed, high and terminating in points anteriorly. Pectoral fins small, longer than the half of the space which separates their base from the tail.

Color of a fine blue upon the back, the under side and the opercula silvery; the iris bluish and argentine. Scales very small.

P. 18.—V. 6.—A. 19.—D. 16.—C. 26.

Collected near the Island of Guadaloupe, in 1816.

*B. *truncata.*

Lower mandible longer than the upper; caudal fin obliquely truncated, ventral small, lateral line passing above and prolonged to the base of the anal fin into its posterior part, where it rises to pass along the carina to the base of the caudal fin.

DESCRIPTION. Body almost quadrangular, more than three times the length of the mandibles, wider upon the back, which is flat and sloping on either side, so as to form a groove along its middle.

On each side towards the back there is a line with an elongated point, and a little lower a small deep blue band, which is continued almost to the base of the dorsal line. Jaws long and pointedly terminated, the inferior a little longer than the superior, armed with fine conic teeth, of which some are longer and distant with small ones between them; teeth of the throat collected upon tubercles. Head flat above:

throat edged; eyes large at the summit of the head, silvery; nostrils before the eyes, in a triangular cavity. Base of the caudal fin depressed and carinated as in the preceding species; caudal fin truncated, lobes arrounded. Anal and dorsal fins as in the preceding. First rays of the pectoral and ventral fins flat and edged. Pectorals small, pointed. Ventrals smaller truncated, situated between the tail and the eye.

Color, a deep blue on the back, with a deeper colored band on each side. Scales very fine, silvery upon the head and abdomen.

B. —P. 16.—V. 6.—D. 16.—A. 19.—C. 20.

Collected at New-York in October 1816; at Philadelphia, and at Newport in Massachusetts.

OBSERVATIONS. At New-York this species is called Gar-fish or Bill-fish. I have also seen it sometimes in the market of Philadelphia.

B. **carribæa*.

Mandibles equal, slender, and pointed; dorsal fin continued further backward than the anal, the last rays also longer; caudal fin scalloped, lobes arrounded, the inferior twice as long as the superior.

Body almost cylindric, more than four times the length of the snout. Head depressed, long and wrinkled above. Eyes large, at the summit of the head, iris blue and silvery, pupil black and notched above. Nostrils large, near to the eyes. Opercula

smooth and flat, the lamina silvery, not very distinct. Both jaws armed with conic pointed distant teeth, producing between them small velvet like teeth, with which the jaws are furnished on each side throughout their whole length. Pectoral fins in a line with the eyes, as long as the space which separates them; the first rays of the pectoral, ventral, and the second of the anal, are flat, strong and edged. The anal and the dorsal fins are narrow posteriorly, and very high and pointed anteriorly, in the form of a sickle. Ventral fins rather long, situated between the eye and the base of the caudal fin. The lateral line commences beneath the origin of the pectoral fins, its base touches the ventral and continues along the abdomen to the base of the anal, where it rises and continues along the carina, so as equally to divide the tail. Seven rays of the tail on each lobe are very flat.

Color, deep blue upon the back, the head, tail, and whitish silvery beneath. Scales as in the preceding species, small, and rounded.

P. 13.—V. 6.—D. 24.—A. 22.—C. 30 $\frac{7}{8}$ flat.

Inhabits the Carribean sea at Basseterre, near the island of Guadaloupe. Collected in 1816. Flesh good and firm.

4. BELONA **Crocodila*. Peron and Lesueur.

If we might judge from the imposing aspect of the individual which we saw, this species appears to attain a very considerable magnitude. It is distinguished from *Esox Belona* and the other species designated and described by a very strong conic straight pointed snout, the bony plates of which are strongly radiated in order to protect the head. The body is less elongated and thicker, more elevated and not carinated towards the tail, the terminating fin of which is lunulated with the lower lobe much longer than the upper. The dorsal and anal fins are falci-form, and long, the anterior part elevated, terminating in a point, and equally placed, the posterior very low and straight, more prolonged to the dorsal than the anal fins, ventral rather long and pointed, lunulated, situated nearer the eyes than the tail, pectoral fin small, elevated, placed near to the angle of the operculum. Jaws strong, straight and equal, forming an elongated cone, pointedly terminated and scattered, all armed with strong conic straight and scattered teeth, between the bases of which there are numerous other smaller ones which cover the maxillary bones throughout their length. The scales which cover the body are small. The lateral line commences at the gorge, is undulated under the pectoral fins, passes above the ventrals, and rises a little to continue along the middle of the tail. The color is similar to the preceding species.

P. 14.—V. 6.—D. 22—A. 21. Caudal 28.

The total length of this individual was thirty-one and a half inches, the head alone was nine and a half from the beak to the termination of the operculum, with a height of about two and a half inches, and nearly two wide between the eyes.

The armature of its jaws renders it dangerous and deservedly feared by those who swim or bathe in the places which it frequents. This was the species in all probability which had been observed by Renard and which is spoken of by Monsieur Delacépède, which had been confounded with the *Esox Belona*.

Collected on the coast of the Isle of France. In the Museum d'Histoire Naturelle, marked R. R. No. 4.

5. *BELONA* **Indica*. This species observed by Perron and myself, makes a near approach to that of Gaudaloupe, and I shall here endeavour to present the characters by which they differ. This species as well as *B. caribæa*, has jaws which are equal, but in this they are more robust, obtuse, and thicker at their extremity while in that they are slender and terminated by a flexible point, it is further recognisable by its obliquely truncated caudal fin, slightly scolloped with arrounded lobes, and the lower one longer : the dorsal and anal fins are likewise similar in form, placed exactly opposite each other, they are also elevated anteriorly, very low and straight, pos-

teriorly. Anal fin narrower. Ventral long pointed. Pectoral longish. Lateral line originating from the throat, passing above the ventrals and almost along the middle of the tail. Scales very small. Teeth as in the preceding species.

P. 14.—V. 5. D . 19.—Caudal 14.

OBSERVATIONS. Body subquadrangular larger towards the head, and attenuated towards the tail, where there is no visible keel. The back, head and tail blue, sides and abdomen silvery, a clearer coloured band towards the back.

We never observed more of this species than the individual which is now preserved in the Museum of Natural History at Paris, and the figure in my collection of drawings.

Inhabits the Indian Ocean.

SCOMBERESOX. LACEPEDE.

In this genus the structure of the snout is similar to that of *Belona*; the appearance of the fish itself the same and covered with similar scales, having a carinated range along the venter; but the latter rays of their dorsal and anal fins are detached into false ones as in the mackerel.

Monsieur Cuvier remarks that he had only seen a single species from the Mediterranean and the ocean. (The *Scombresoces camperien*, of Lacepede, v. VI. 3. *Esox Saurus*. Schneider 78.)

*SCOMBERESOX *equirostrum.* Five false fins above and below the tail; jaws equal and flexible.

Body fusiform, about six times the length of the jaws. Head narrow, rather deep, pointed, eye small. The operculum prolonged behind. Pectoral fins situated a little further back and somewhat higher than the middle of the operculum and slightly arrouded. Dorsal and anal fins equal, low, opposite each other, ventral fins triangular, truncated. Caudal a little notched, with equal lobes.—The color of this individual appeared to me nearly the same as that of the *Belonas*.

P. 14, the first flat and broad. V. 6.—D. 11.—A. 14.—C. 20 rays.

The above notice is taken from an individual preserved and dried in the cabinet of the Linnean Society of Boston, under the name of *Saurus*. It cannot be regarded as sufficiently complete, but may serve to call the attention of others who may have a better opportunity of completing its description.

*SCOMBERESOX *scutellatum.* Upper jaw very short, the inferior about twice its length; pectoral fins very short, situated towards the upper part of the opercula; six false fins above, and seven below; the body compressed and edged beneath.

OBSERVATIONS. The body of this small individual was compressed so as to resemble the blade of a knife. It is distinguishable from the preceding also

by the very small pectoral fins placed very high, and near the opercula. The depth of the head was more than twice the diameter of the eye. The ventral fins very small, approaching the anal, and situated a little more towards the head than the dorsal, all of them of the same form, a little elevated anteriorly and somewhat lower posteriorly. The tail is long and narrow, terminated by a lunulated fin. The lateral line was scarcely apparent. The upper and lower maxillar bones were furnished with small teeth, the upper maxillar the shortest, placed in a groove formed by the junction of the two inferior, and leaving a space betwixt them towards the angle of the mouth.

The back was blue, the sides silvery and blueish, and the abdomen argenteous.

P. 13.—D. 11.—A. 12.—V. 6.—A 15

The individual here noticed, I found in the stomach of a fresh codfish which had been brought to Boston from the Bank of Newfoundland ; it was still fresh, and had no appearance of putrefaction. Perhaps it might be referred to the *Scombresoces Camperien*, but that this has much longer jaws, a forked tail, and the pectoral fins placed over the middle of the opercula, which forms the distinctive mark between the *Sc. camperii* and the present species.

Another individual discovered by Peron and myself, bears also a considerable affinity to the *Sc. camperii*, in the form of the body and the jaws ; but a distinctive character presents itself in the 6th and

7th false fins which are distant from the dorsal and anal fin, which are re-united by a membrane.

HEMIRAMPHUS. CUVIER.

In these the intermaxillary bones form the border of the upper jaw, the margin of the lower one is also furnished with small teeth, but its symphysis is prolonged into a long point, or half beak, destitute of teeth. In their general aspect, their scales and vicera. they still resemble the Belona.

They are found in the seas of both hemispheres ; and their flesh, although oily, is agreeable to the taste.

While Mr William Maclure and myself were passing the islands of the Antilles, we had occasion to observe two species of fish, appertaining to the new genus *Hemiramphus* of Cuvier. These no less than the Belonas and Scombresoces appear to have been confounded together without sufficiently appreciating the species which consequently still remain uncertain. One of those which came under my observation, appears to be that described under the name of *Esox Brasiliensis*. LIN. and BLOCK, 391, which is also the *Esox Marginatus* of LACEPEDE, v. VII. 2. The other appears to be new ; but for the sake of more accurate distinction, I have considered it useful to give the comparative descriptions which I made at different places as at Martinique, Guadaloupe, Dominique, &c. where these species are the object of a particular fishery, sufficiently interesting by the manner in which it is conducted.

The mode of procuring these fish whose flesh is so much esteemed, is with a large seine taken out into the deep water by a company of boats, when the weather is fine. On discovering a shoal of the *balao*, they amuse them by throwing some light body on the water, such as the leaves of the sugar cane, round which they delight to play and jump; the boats outside the fish then let fall the nets, by which they surround, and while drawing the net towards the land, perogues, each occupied by a single negro, follow the net outside, making a noise and throwing stones, in order to chase the fish towards the shore, and to prevent them from leaping over the net and escaping.

HEMIRAMPHUS marginatus. Body three times the length of the lower jaw; pectoral fins shorter than the half of the lower jaw; posterior fins almost equal.

DESCRIPTION. Body subquadrangular, short, equal from the head to the tail as far as the commencement of the anal and dorsal fins. Tail short, terminated by a deeply cleft fin, the lobes slightly arrouded, the inferior a third part longer than the superior. Pectoral fins pointed. Ventral small, and lunulated, pointed interiorly, placed more towards the tail than the head. Dorsal fin longer by a third part than the anal, their form considerably similar, straight, a little elevated anteriorly, the rays separated and free about a third of their length, these two fins also correspond posteriorly. The upper beak is shorter than

the semidiameter of the eye. The inferior very long and flexible. The eye is nearly black, with the upper part of the iris silvery. The scales large. The blue color is most prevalent, particularly upon the upper part of the body, paler along the sides, and argenteous upon the abdomen, the head of a clear blue, and silvery, the tail yellow and bluish; beak brown and deep blue.

P. 10.—V. 6.—D. 14.—A. 12.—Caudal 20 to 24.

HAB. near Guadaloupe and Martinique, where it is called *Balao*.

HEMIRAMPHUS **balao*. Body four times the length of the lower jaw, pectoral fin a third part shorter than the lower mandible; anal fin half as long as the dorsal fin.

It is sufficient to cast an eye over the two figures to recognize their difference, although the two species seem to be the same. In this the body is more elongated and less equal, more elevated upon the back, and more attenuated towards the tail, in this also the fins are longer, the lobes divided by a longer notch are pointed, narrower, and the inferior more elongated; the pectoral, dorsal, anal and ventral fins also more developed, the interior point of the ventral more prolonged; the snout shorter, and lower towards the throat, the lower mandible likewise shorter, but with the upper nearly as in the preceding species. The lateral line commences directly from the gorge, continues along the abdomen as far as the ventral fins,

where it is interrupted, and then proceeds to the tail, passing a little beneath the anal, as in the preceding species.

The colour is nearly the same as in the preceding, only a little deeper, and the caudal fin bluish. The fins contain the same number of rays. Not having time to open the species, I am unacquainted with its sex. It inhabits the Caribbæan sea, near Guadaloupe, Martinique, and Domingo, where in common with the other species, it is known by the name of *Balao*.

HEMIRAMPHUS **erythrorinclus*.

Dorsal and anal fin equal in length and height; upper beak about the length of the diameter of the eye; pectoral fins half the length of the lower jaw; a blue and argentine band on each side continued from the pectoral to the caudal fin.

OBSERVATIONS. Body four times the length of the lower beak from the angle of the mouth to the extremity of the tail. The form of this species differs little from that of the preceding. The dorsal and anal fins, equal in length and height, are perfectly opposite, elevated anteriorly, and at the base posteriorly. Pectoral fins pointed; the ventral small and truncated; the caudal forked, the lobes pointed, the inferior lobe longer. The lateral line, more elevated, passes above the ventral and anal fins, but is not as in the preceding species interrupted by the ventral fin. The eyes are large, and a little oblong,

with an argentine iris. The scales large. Its color the same as the preceding.

P. 13.—V. 6.—D. 16.—A. 18.—C. 21.

In the Museum d'Histoire Naturelle, marked R. R. No 3, with a note, by Peron, under the above name, and No. 2568 of his Journal, he afterwards considered it as a new genus, which has now been established by Monsieur Cuvier in his *Regne Animal*.

B. A variety of *H. erythrorinchus*.

Near to Timor and the Isle of France, we met with a species which differs a little from the preceding in the form of its body, its color, and the argentine band on the side, but the form of whose dorsal and anal fins were, excepting some difference in the number of the rays, the only distinctive characters which could be remarked. The length of the body, moreover, was in this only three times that of the lower jaw. The dorsal fin is falciform, high, pointed anteriorly, and very low and straight posteriorly. The anal is as long as the dorsal fin, perfectly opposite to it, and almost straight, being only a little elevated anteriorly. The pectoral fins are shorter than the half of the lower jaw. The ventrals small and truncated. Caudal fin deeply forked, the lobes unequal, with the inferior longer.

P. 11.—V. 6.—D. 15.—A. 15.—C. 20. rays.

In the Cabinet of the Museum d'Histoire Naturelle, at Paris : marked R. R. No. 2.

One or other of these two individuals probably appertains to the species observed by Commerson, or the *Esoce* Gambaru of Lacepede, Vol. V. p. 313, tab. 7. fig. 2.